Task Safety Analysis Worksheet

Note: the format of this form may be changed to suit the user.

Task/Job:	**Facility**:	**Date**
PPE:	**Analysis by**:	**Reviewed by (signature)**

Basic Task/Job Steps or Sequence	Potential Hazards	Recommended Safe Job Procedure

Task Safety Analysis (TSA)

The Task Safety Analysis is required for those potentially hazardous operations/tasks that are performed in a non-laboratory environment. For tasks or processes involving laboratory chemicals and hazardous operations, a Chemical Process Hazard Analysis (PHA) should be used.

In addition to the TSA, an Area Hazard Analysis (AHA) is a non-mandatory assessment tool used to help supervisors determine the types of potentially hazardous work or processes that are being performed in their areas. The AHA will provide checklists that allow the supervisor to identify area hazards and take correct measures to either eliminate or reduce their risks.

1. What is a TSA?

A TSA is a method of performing a hazard analysis on each specific task that could involve a hazard in a non-laboratory workplace. This checklist follows the format and methodology of OSHA pamphlet 3071, "Job Hazard Analysis," available at http://www.osha.gov/Publications/osha3071.pdf .

The format of the TSA Form is optional, and may be changed to suit the user's needs. A sample TSA is provided at the end of these instructions.

2. What are the advantages of a TSA?

The big advantage of a TSA is that the employees are involved from the beginning in reviewing their tasks to see if they can do their jobs more safely. Employees also work in partnership with their supervisors to improve their job safety.

3. What are the disadvantages of a TSA?

The disadvantage to a TSA is that you must review each task you do in great detail to do an adequate analysis. Management must be prepared to make changes to tasks or job conditions that may affect the cost of the operations. Although this technique is one way of doing a hazard analysis, it can be time-consuming if used on large-scale operations or facilities.

4. Get employees involved in doing TSAs

Employees must be involved in the TSA. This shows that the supervisor is interested in the employee's safety, and the employee has the most comprehensive knowledge of the job being analyzed.

5. Where should I start?

You start a TSA by asking the following questions

- What job has the highest injury or illness rates?
- What job has the highest close call rates?
- Is the job a new job that has never been done before?
- Has the job changed?
- Have I looked at the job and the general conditions that might affect how the job is being done?
- Have I developed a checklist for the job?

After you have answered these questions, follow the steps in paragraphs 6 – 10.

6. Begin by asking questions. You should add other questions for situations unique to your task.

Ask questions such as:

- Are there materials on the floor that could trip a worker?
- Is lighting adequate?
- Are there any live electrical hazards at the job site?
- Are there any explosive hazards associated with the job or are they likely to develop?
- Do tools, including hand tools, machines, and equipment, need repair?
- Does excessive noise in the work area hinder worker communication and increase the risk of hearing loss?
- Is fire protection equipment readily accessible and have employees been trained to use it?
- Are emergency exits clearly marked?
- Are trucks or motorized vehicles properly equipped with brakes, overhead guards, backup signals, horns, steering gear and identification, as necessary?
- Are all employees operating vehicles and equipment properly trained and authorized?
- Are employees wearing proper personal protective equipment (PPE) for the jobs they are doing?
- Have any employees complained of headaches, breathing problems, dizziness, or strong odors?
- Is ventilation adequate?
- Does the job involve entry into a confined space?
- Have there been any tests for oxygen deficiency and toxic fumes?
- Are there systems that require lockout/tag out procedures?
- Does this job require special handling procedures for chemicals or pyrotechnics?
- Are there any other questions that might be appropriate?

7. Break down the job into specific steps that are required to do the job.

List each step of the job in order of occurrence as you watch the employee doing the job. Make sure that you record enough information about the task to be able to analyze the task properly, but not in too much detail.

Identify hazards associated with each job task

Ask questions such as:

- Is the worker wearing clothing or jewelry that could get caught in the machinery?
- Are there fixed objects that may cause injury, such as sharp machine edges?
- Can the worker get caught in or between machine parts?
- Can reaching over moving machinery parts or materials injure the worker?
- Is the worker off-balance at any time?
- Is the worker positioned at the equipment in a way that is potentially dangerous?
- Is the worker required to make movements that could cause hand or foot injuries, repetitive motion injuries, or strain from lifting?
- Can the worker be struck by, lean against, or strike a machine part or object?
- Do suspended loads or potential energy pose a hazard?
- Can the worker fall from one level to another?

- Can the worker be injured from lifting objects, or from carrying heavy objects?
- Do environmental hazards, such as, dust, chemicals, radiation, welding rays, heat, or excess noise, result from the performance of the job?

Repeat the job observations as often as necessary until you have identified all hazards.

8. Evaluate the hazard that you have identified.

Remember to look at possible events that could cause an injury or illness from each of the hazards identified. Some typical questions you might use to evaluate the hazards are:

- Is the worker wearing protective clothing and equipment, including safety belts or harnesses that are appropriate for the job?
- Does it fit properly?
- Has the worker been trained to use appropriate Personal Protective Equipment?
- Are work positions, machinery, pits or holes, and hazardous operations adequately guarded?
- Are lockout procedures used to deactivate machinery during maintenance procedures?
- Is the flow of work improperly organized?
- How are dusts and chemicals dispersed in the air?
- What are the sources of noise, radiation and heat?
- What causes a worker to contact sharp surfaces?
- Why would a worker be tempted to reach into moving machine parts?

9. Recommend controls for each hazard

Use the most reliable controls possible.

Review the controls with the employee doing the job to determine whether the job could be done differently to eliminate the hazards, or whether training is needed to recognize hazards.

If safer and better job steps can be used, list each new step.

List exactly what the worker needs to know to do the job using the new methods.

If hazards are still present, try to reduce the necessity for doing the job or the frequency of doing the job.

10. What do I do after I complete a TSA?

Review the TSA each year or when any conditions or operations change.

SAMPLE
Task Safety Analysis Worksheet

Task/Job: Plasma Etching with Techniques RIE -85 Plasma Etcher	**Facility**: Bldg 1103 Plasma Lab	**Date** 10/22/2002
PPE: None required, ventilation of pump exhaust recommended	**Analysis by**: Elmer Fudd	**Reviewed by:**

Sequence of Basic Task/Job Steps	Potential Hazards	Recommended Safe Job Procedure
Installation	• Electrical hazards, missing guards, chemical hazards, unstable mounting	• Proper warning signs in place • Etcher placed securely on cart sufficiently large to hold all equipment • Toxic gases are not to be used for etching
Normal Operation 1. Checkout • Check system for proper connections (power, vacuum pump, compressed gases) • Check O-ring for damage and wear	• Inadequate training and instruction • Lack of operating procedure addressing hazards, warnings • Exposure to vacuum pump exhaust	• Only trained operators will operate plasma etcher • Procedure for plasma etcher (EL-011a) notes hazard warnings, cautions, emergency procedures • Pre-operation inspection addresses ensuring vacuum pump properly set-up and vented to lab hood. • Pre-operation inspection addresses ensuring that the system is properly grounded prior to use
2. Activation and use • Activate power for unit and cooling system • Select LEVEL adjustments for RF and gasses • Select OPEN for vacuum switch, pump down system • Select settings for each gas channel • Switch ON RF power and set desired power level • Switch OFF gases and RF power, system pumps down	• Electrical hazards Exposure to toxic gases • Unintentional release of stored energy in compressed gas cylinders or release of compressed gas causing asphyxiation • Improper operation of plasma etcher • Explosion • Inadvertent exposure to RF energy	• Use of toxic materials prohibited • Bottles must be secured, regulators set, hoses connected, and valves closed on unused cylinders. Cylinders used in well-ventilated areas. • Only trained operator allowed to use plasma etcher • Use of non-reactive oil in vacuum • Procedural warnings against defeating interlocks; pre-inspection of cables; deactivation of RF generator when equipment is not in use

Sequence of Basic Task/Job Steps	Potential Hazards	Recommended Safe Job Procedure
3. Sample Introduction, removal • Load parts in chamber on driven electrode • Close chamber cover, open vacuum valve, allow system to pump down • Switch on gases, all chamber to stabilize, switch ON RF power • Switch OFF RF power and gases, allow system to pump down • Close vacuum valve and open VENT valve • Wait 5 seconds, open chamber, remove sample, close vent valve	• Inadvertent exposure to hazardous materials/use of incompatible sample material • Inadvertent exposure to RF energy	• Procedural warnings against using toxic gases for etching • Procedural warning against using materials which could decompose into hazardous materials • MSDS sheets available in lab • Personal protective equipment used as required • Vacuum pump exhausted into fume hood • Procedural warnings against defeating interlocks; pre-inspection of cables; deactivation of RF generator when equipment is not in use
Shutdown	• Plasma etcher left activated, unauthorized use	• Procedure EL-011a address shutdown procedures
Maintenance, changes or repair	• Shock, safety features defeated and not returned to normal • Exposure to hazardous chemicals • Explosion caused by using improper pump oil	• Only authorized service personnel will perform repairs • Procedure to address daily maintenance limited to replacing vacuum pump oil, flushing lines with hydrogen peroxide, and minor adjustments. • Procedure addresses disconnecting power cord before performing adjustments • MSDS available for hydrogen peroxide and FOMBLIN oil, use of PPE • Procedure addresses using only FOMBLIN (non-reactive) oil in vacuum pump